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PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Quick-Release Coupling

We, NORCO INC., a corporation organised under the laws of the State of Connecticut, United States of America, of P.O. Box 405, Georgetown, Connecticut, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to quick-release couplings adapted to secure together elongate parts.

The invention provides a quick release coupling comprising, in combination, a first elongate body member having a pair of sockets in one side, disposed respectively adjacent and opening into its ends and adapted to receive end fittings which include bulbous enlargements, on elongate parts which are to be joined, each of said sockets having an end opening, a pair of slide parts disposed on and cooperable with the body member, one slide part being movable along the member and the other slide part having a driving connection with the member, a second elongate body member disposed alongside and longitudinally slidable on the first member, said second body member having in a side facing said one side of the first member a pair of sockets disposed respectively adjacent and opening into its ends and cooperable respectively with the sockets of the first member for receiving said bulbous enlargements, each of said sockets having an end opening, said slide parts being also disposed on and co-operable with the second body member and holding the members against lateral separation while permitting relative longitudinal movements thereof, the other of said slide parts being movable along the second body member and said one slide part having a driving connection with said second body member whereby relative movement of the slide parts effects relative longitudinal move-

ment of the body members to provide side access to the sockets in the sides thereof.

In order that the invention may be more readily understood, reference will now be made to the accompanying drawings, in which:—

Fig. 1 is a side elevational view of one embodiment of the coupling of the invention, Fig. 2 is an end elevational view of the coupling of Fig. 1,

Fig. 3 is a longitudinal sectional view, enlarged, taken on the line 3—3 of Fig. 2 and illustrating additionally a pair of coupled cable end fittings,

Fig. 4 is a transverse sectional view, taken on the line 4—4 of Fig. 3,

Fig. 5 is a top plan view of an elongate body member of the coupling,

Fig. 6 is a bottom plan view of the body member shown in Fig. 5,

Fig. 7 is an axial sectional view similar to that of Fig. 3 but showing the body members shifted longitudinally with respect to each other, for the purpose of receiving or releasing a cable end fitting illustrated in broken outline,

Fig. 8 is a view of the coupling partly in side elevation and partly in axial section, illustrating a method of attaching a cable end fitting,

Fig. 9 is an axial sectional view of a coupling constituting another embodiment of the invention where a spring means is of the compression type and also showing a pair of coupled cable end fittings,

Fig. 10 is a view like that of Fig. 9 but showing the cable end fittings removed and the coupling parts in their releasing positions,

Fig. 11 is a top plan view of one body member of the coupling of Figs. 9 and 10,

Fig. 12 is a longitudinal section through the body member of Fig. 11, taken on the line 12—12 thereof,

Fig. 13 is a transverse section of the body

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member taken on line 13—13 of Fig. 11, and

Fig. 14 is an axial sectional view of a coupling constituting yet another embodiment of the invention, wherein a compression spring means is wholly confined against sidewise movement.

Referring first to Figs. 1—8, the quick-release coupling shown therein comprises a pair of elongate body members 10, 12. The body member 10 has sockets designated generally 14, 16 disposed in its inner flat side, respectively adjacent and opening into its ends and adapted to receive end fittings 20 of elongate parts shown as cables which are to be connected together. The fittings 20 include bulbous enlargements 18. The body member 12 also has in its inner flat side a pair of sockets 22, 24 adjacent and opening into its ends and adapted to cooperate respectively with the sockets 14, 16 for the purpose of nesting and gripping the enlargements 18.

The body members 10 and 12 are identical to each other and arranged with their dissimilar ends adjoining each other. The sockets 14, 24 are identical, this same being true of the sockets 16 and 22.

When the body members 10, 12 are assembled as illustrated in Fig. 3 and disposed in alignment with each other, that is, so as to be coextensive, they form in effect a tube-like body structure having a central bore 26 communicating with the sockets 14, 16, 22, and 24. Also, the body members 10, 12 have their flat sides 28, 30 engageable with and slidable on each other whereby the tube-like body structure has a line of separation along a diametric plane.

Further, the body members 10, 12 have semi-cylindrical outer peripheral surfaces 32, 34 respectively which together form a closed and complete cylindrical outer periphery when the body members are assembled and in alignment as shown in Fig. 3.

The bore 26 of the tube-like body structure is constituted of two centered longitudinal grooves disposed respectively in the sides of the body members and intermediate their ends, one groove 36 being in the member 10 and communicating with the sockets 14, 16 and the other groove 38 being in the body member 12, and which communicates with the sockets 22, 24.

The sockets 14, 16, 22 and 24 include end openings comprising semi-circular notches 40, 42, 44 and 46 respectively, which provide clearance for the end fittings 20 of the cables as seen in Fig. 3. The notches 40, 46 have bevels 47 as shown. The sockets 14, 24 have part-spherical portions adjoining the notches 40, 46 and located at the ends of the grooves 36, 38 respectively whereas the sockets 16, 22 comprise portions having large and small part-spherical surfaces of revolution, the portions thereof being designated respectively 48, 50 and 52, 54 in addition to

the notches 42, 44. The smaller portions 50, 54 adjoin the end notches 42, 44 respectively, as clearly seen in Fig. 7.

The socket portions 48, 50 and 52, 54 are so arranged that the small portions 50, 54 supplement the part-spherical portions of the sockets 24, 14 respectively to accommodate the enlargements 18, as clearly shown in Fig. 3. Also, the larger socket portions 48, 52 are sufficiently deep in the body members 10, 12 to accommodate the enlargements 18 with enough clearance provided by the notches 40, 46 to permit return movement of the body members to the aligned coextensive positions of Fig. 3 from the Fig. 7 positions, when the enlargements 18 are in place. The reverse of this movement is also made possible in the following manner. Considering Fig. 3, the load is first removed from the cables so that the end fittings 20 are free to shift inward toward each other. Then, when longitudinal separating forces are applied to the body members 10, 12, such reverse disaligning movement can be easily effected, by means now to be disclosed.

For the purpose of yieldably holding the body members 10, 12 in their aligned coextensive positions as shown in Fig. 3 and against lateral separation, and to enable the body members to be slid on each other relatively longitudinally to the releasing positions of Fig. 7 or Fig. 8, slide parts 56, 58 constituted as collar pieces are provided, slidably carried by and encircling portions of the assembled body members and conforming to the cylindrical external surface of these, by having a cylindrical, complete ring-like shape. Normally, as seen in Fig. 1 the slide parts 56, 58 have their adjoining ends in engagement with each other when the body members 10, 12 are free of the bulbous enlargements 18, and the combined lengths of the slide parts is slightly less than the lengths of the body members 10, 12. Also, the body members 10, 12 at their ends have abutment shoulders in the form of semi-circular end flanges 60, 62 respectively, adapted to engage the slide parts 56, 58 respectively and prevent relative unidirectional movement of the slide parts and body members.

By such arrangement, when the slide parts 56, 58 are spread apart as indicated in Fig. 7, they will carry with them the associated flanges 60, 62 and body members 12, 10 having such flanges. As a consequence, the relative longitudinally shifted positions of the body members shown in Fig. 7 will be attained. Normally the body members 10, 12 and the slide parts 56, 58 are biased to the positions of Fig. 3 wherein the body members are coextensive with each other and the sockets 16, 22 except for the end openings comprising the notches 42, 44 thereof are covered by the members, this being effected by a helical extension spring 64 which is

wholly enclosed, being carried in the bore 26 of the coupling and having out-turned, radially extended end portions 66, 68 received respectively in transvers holes 70, 72 of the body members 10, 12.

In Fig. 7 the spring 64 is stretched and tends to return the body members and slide parts to the aligned positions of Fig. 3. For the Fig. 3 positions the spring 64 is still under some tension thereby to maintain the alignment indicated.

Considering Fig. 3, if the slide parts 56, 58 should be grasped and spread apart while no load is being experienced by the cables this action will bring the enlargements 18 into the socket portions 48, 52 respectively and as the spreading apart movement of the slide parts 56, 58 is continued, the positions of Fig. 7 will be reached whereupon the end fittings 20 will be free for removal from the coupling. In Fig. 7 access is possible to the sockets 16 and 22. Sufficient clearance is provided by the notches 42, 44 to permit such removal even though the slide parts are still encircling the body members.

Fig. 8 illustrates a method by which the cable end fittings can be inserted in the connector. In this figure, the slide part 58 is shown as being grasped by the fingers of one hand. The cable fitting 20 shown in this figure is grasped by the other hand, and the enlargement thereof forced into the end portion of the coupling adjacent the slide part 58, as illustrated. This action will effect a retraction of the body member 12 with respect to the slide part 58, with the result that the enlargement 18 can be forced into the socket portion 48 whereupon the spring 64 will return the body member 12 to the coupling position illustrated in Fig. 3. The bevel 47 greatly aids in this method of insertion.

The semi-circular flanges 60, 62 constitute driving connections between the body members 12, 10 and the respective slide parts 56, 58 as will be understood. Also, it will be seen that the slide part 56 could be rigidly affixed to the body member 12, and also the slide part 58 could be rigidly affixed to the body member 10 without impairing the operation of the coupling. Thus, the provision of the semi-circular flanges 60, 62 constitutes one convenient way of effecting a driving connection which can obviate the necessity for effecting a rigid securement of the slide parts to the associated body members.

The assembly of the connector is as follows: One slide part is put on each body member, and then the body members and slide parts are assembled to the positions of Fig. 7. The spring 64 is then pulled into the bore 26 by attaching a suitable pulling tool to one end portion of the spring. Thereafter, the spring end portions are fitted into the holes 70, 72 of the body members whereupon the coupling will automatically tend to

close to the retracted, assembled position of Fig. 3.

The spring 64, instead of being an extension spring, could instead be a compression spring if its end portions were anchored differently. For example, the body member 10 could have another spring anchorage hole 70a at a different location, and the body member 12 could have another spring anchorage hole 72a at another location, all as shown in Figs. 3, 5, 6, 7 and 8. A compression spring like the spring 64 could have its end portion 68 anchored in hole 70a, and its end portion 66 anchored in hole 72a. Then the spring would resist longitudinal separation of the members 10, 12 to the Fig. 7 position, as will be now understood.

Another embodiment of the invention is illustrated in Figs. 9—13. The coupling shown in these figures differs in the following respects from that already described above. The spring means is of a simpler compression type as distinguished from the extension type spring 64 illustrated in Figs. 1—8. Fig. 9 reveals elongate parts 76 again shown as cables having end fittings with bulbous enlargements 78. The end fittings are nested in sockets of cooperable body members 80, 82. The body member 80 has socket portions 84 and 86 adjacent its two ends, communicating respectively with end notches 88, 90 of the sockets. The body member 82 has socket portions 92, 94 adjacent its ends, communicating with end notches 96, 98 respectively of the sockets. The socket portions 84, 94 cooperate to nest one of the enlargements 78, and the socket portions 86, 92 cooperate to nest the other enlargement. The body members 80, 82 have centrally disposed grooves 100, 102 intermediate their ends, in which there is accommodated a compression-type coil spring 104 the ends of which respectively engage shoulders 106 and 108 at opposite ends of the grooves 100, 102. The body members 80, 82 are encircled by finger engageable slide parts 110, 112 connected by pins 114, 116 respectively to the members 82, 80.

Fig. 10 illustrates the releasing position of the coupling, as effected by pulling apart the slide parts 110, 112 against the action of the compression spring 104. It will be noticed that such spring is fully compressed, and that when the separating force is removed from the slide parts 110, 112 the spring 104 will expand to the position illustrated in Fig. 9, bringing the body members 80, 82 into registration, that is, into coextensive positions.

Operation of the coupling illustrated in Figs. 9—13 is similar to that of Figs. 1—8. With the body members in the positions of Fig. 10, the end fittings can be inserted in or removed from the coupling. When the cable end fittings are nested in the coupling as illustrated in Fig. 9, the spring 104 and also the

tensile forces in the cables 76 will tend to maintain the aligned positions of the body members whereby the end fittings are held captive. Removal of most of the load from the cables 76 is necessary in order to shift the body members longitudinally out of their coextensive positions to the releasing positions of Fig. 10 for release of the end fittings.

Yet another embodiment of the invention is illustrated in Fig. 14. This embodiment is generally similar to that of Figs. 9—13, except that the configuration of the body members is slightly different in order to effect a more complete confinement of the compression coil spring. In Fig. 14, the body members 80a, 82a have centrally disposed grooves 100a, 102a, which are of greater length than the corresponding grooves 100, 102 as shown in Figs. 9—12. The walls of such longer grooves effect a more complete confinement of the compression spring 104, as is readily seen from an inspection of Fig. 14. Otherwise, the construction and operation of the coupling of Fig. 14 is identical to that of Figs. 9—13.

It will now be understood from the foregoing that there is provided a simple quick-release coupling adapted for securing together the end fittings of elongate parts which have enlargements thereon. The spring is seen to be wholly enclosed and major portions of the sockets and the grooves of the body members are also enclosed. When the coupling is assembled with cable end fittings as shown in Fig. 3, it cannot be released without first removing at least most of the load from the cables to enable these to be shifted inward, and such action insures against inadvertent release of the coupling while under load. Further, increases in the load on the cables will only tend to make the coupling hold these more securely, since the enlargements 18 of the end fittings while being nested in the sockets of the body members, positively prevent that relative movement of such members which is necessary to effect the cable release. Few parts are involved in the coupling, and the duplication of shapes results in a manufacturing economy whereby the cost of producing the coupling is held to a low figure. The coupling is sturdy and resistant to failure, and may be easily operated to effect the securement and release of the cables. The closed construction of the coupling minimizes the likelihood of dirt and other foreign matter getting inside and interfering with its proper operation. Due to the action of the end fitting enlargements when the cables are experiencing loads, the coupling has utility without relying on any spring action. Thus the springs shown herein may be dispensed with, in those uses where manual restoring of the body members to the coupling positions can be resorted to.

WHAT WE CLAIM IS:—

1. A quick release coupling comprising, in combination, a first elongate body member having a pair of sockets in one side, disposed respectively adjacent and opening into its ends and adapted to receive end fittings which include bulbous enlargements, on elongate parts intended to be joined, each of said sockets having an end opening, a pair of slide parts disposed on and cooperable with the body member, one slide part being movable along the member and the other slide part having a driving connection with the member, a second elongate body member disposed alongside and longitudinally slidable on the first member, said second body member having in a side facing said one side of the first member a pair of sockets disposed respectively adjacent and opening into its ends and co-operable respectively with the sockets of the first member for receiving said bulbous enlargements, each of said sockets having an end opening, said slide parts being also disposed on and cooperable with the second body member and holding the members against lateral separation while permitting relative longitudinal movements thereof, the other of said slide parts being movable along the second body member, said one slide part having a driving connection with said second body member whereby relative movement of the slide parts effects relative longitudinal movement of the body members to provide access to the sockets in the sides thereof.
2. A coupling as claimed in claim 1, and further including spring means biasing the body members to positions wherein they are coextensive and wherein the sockets of each body member except for their end openings are covered by the other body member, said slide parts comprising collars encircling the body members.
3. A coupling as claimed in claim 2, wherein the said collars engage each other at their juxtaposed ends when the body members are free of the bulbous enlargements and are coextensive with each other.
4. A coupling as claimed in claim 1, wherein the body members have centered longitudinal grooves disposed in the said sides thereof and intermediate their ends, said grooves together constituting a central bore of the body members, and spring means biasing the body members to positions wherein they are coextensive and the said sockets except for the end openings thereof are covered by the body members, said spring means comprising a helical spring disposed in said bore and having its end portions engaged respectively with said body members.
5. A coupling as claimed in claim 4, wherein the body members have transverse holes at the grooves thereof, said spring being of the extension type and having out-turned end portions disposed in said holes so as to connect

the spring at its end portions to the body members.

- 5 6. A coupling as claimed in claim 4, wherein the body members have abutment shoulders at the ends of said grooves, said spring being of the compression type and having its ends engaged with said abutment shoulders.

- 10 7. A coupling as claimed in claim 1, wherein the slide parts comprise collar pieces encircling portions of the body members, said driving connections comprising abutment shoulders of the body members, engageable with said collar pieces to prevent relative unidirectional movement of the pieces and members.

- 15 8. A coupling as claimed in claim 7, wherein the collar pieces comprise complete rings completely encircling and movable on the body members.

- 20 9. A coupling as claimed in claim 7, wherein the abutment shoulders of the body members comprise semi-circular flanges at the ends of said members.

10. A coupling as claimed in claim 4, wherein the body members are identical to each other. 25

11. A coupling as claimed in claim 10, wherein the body members have semi-cylindrical outer peripheral surfaces which together form a complete cylindrical outer periphery when the members are coextensive, said slide parts comprising circular rings which are slidable on said outer peripheral surfaces. 30

12. A coupling as claimed in claim 6, wherein the slide parts comprise collar-pieces encircling the body members, said collarpieces being respectively pin-connected to said members. 35

13. A quick release coupling substantially as hereinbefore described with reference to the accompanying drawings. 40

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3 SHEETS

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Sheet 1

Fig. 1

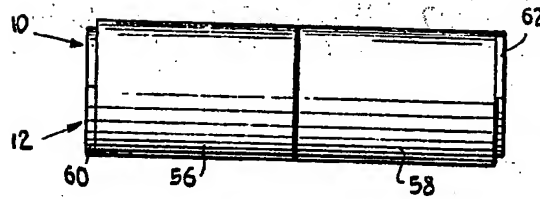


Fig. 2

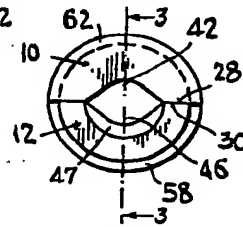


Fig. 3

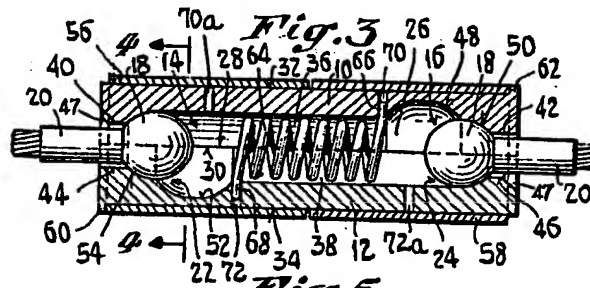


Fig. 4

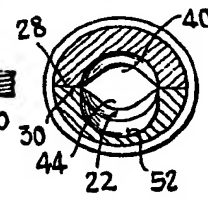


Fig. 5



Fig. 6

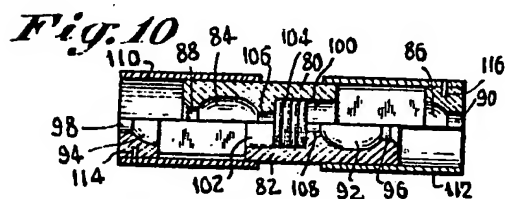
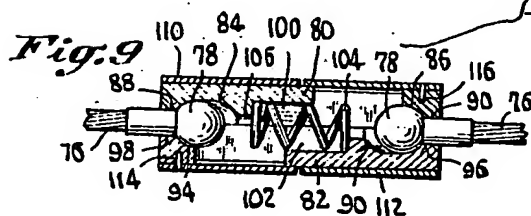
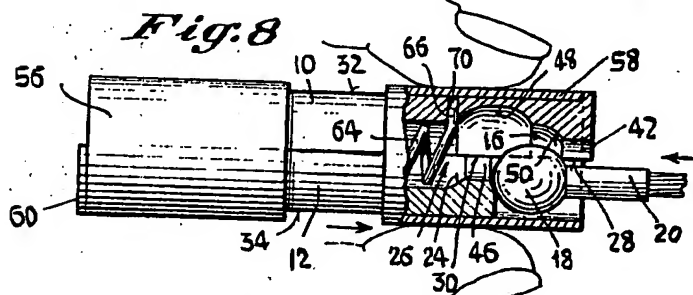
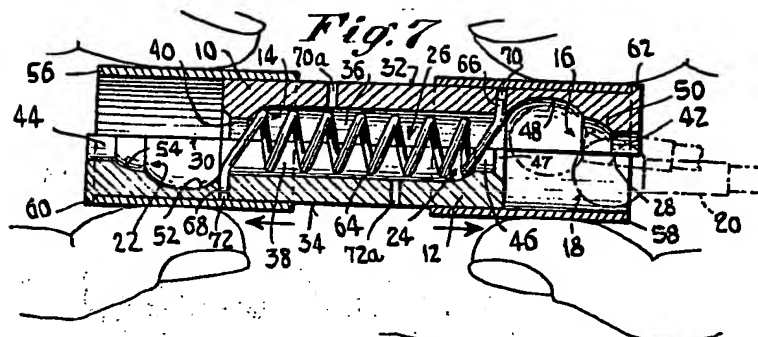


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Sheet 3

Fig. 11

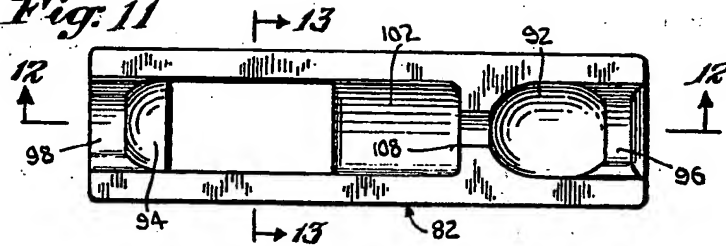


Fig. 12

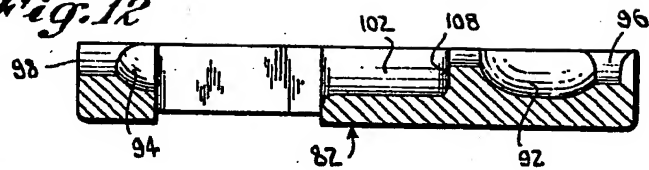


Fig. 13

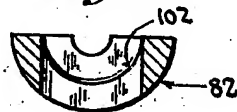


Fig. 14

